

SYNONYMS AND GENOTYPES

By RICHARD E. BLACKWELDER

In our catalogs and revisionary studies we frequently find generic synonymy like the following:

HYPOTHETICUS Linné, 1758.

Subsequens Smith, 1908.

We understand this to mean that these two names have been applied to the same genus and are therefore synonyms. According to the dictionary synonyms are two or more names for the same thing, with all of them being called synonyms. By this definition *Hypotheticus* is as much a synonym as *Subsequens*. The important point is that it is the older one that is the proper one to be used. It is best to distinguish this correct one as the senior synonym, with the unaccepted one as a junior synonym.

In biology there are two quite distinct kinds of junior synonyms. There are some which were clearly proposed for the same genus (new names, stillborn synonyms, and names based on exactly the same species) and are therefore absolutely synonymous; they can never be separated by any means. These are called absolute synonyms, objective synonyms, or nomenclatural synonyms.

There are other synonyms that are synonyms only in the opinion of one or more student. One may lump the two genera into one, making the names synonyms; the other may split them into two genera, making both *names* correct. Synonyms that are thus based on opinion are called conditional synonyms, subjective synonyms, or zoological synonyms. The synonymy can be denied and removed at any time.

The first type we will call absolute synonyms. Their identity can never be questioned. The second type we will call conditional synonyms, since anyone may challenge the identity. Since the absolute synonyms are unchangeable, they give us little trouble and may be passed over here without further comment. The conditional synonyms alone will concern us in the following discussion.

In stating that these two names in the example above are conditional synonyms, the reviser is stating in effect that the species previously included under both are congeneric and therefore belong in a single genus. However, it may be that some of the species previously included under *Subsequens* belong in *Hypotheticus* and some do not. The reviser cannot apply the name *Subsequens* to both groups—as a

synonym of *Hypotheticus* for one and as a separate genus for the other. There must be some means to determine which species the generic name will follow.

This is accomplished under the International Rules of Zoological Nomenclature by the use of the genotype principle. Every generic name is tied to one species, so that the assignment (on zoological grounds) of that species will determine the fate of the generic name. In our example, if the type of *Hypotheticus* is species 1 and that of *Subsequens* is species 7, it is merely necessary to determine whether these two species belong in one genus or not. If they do, then *Subsequens* is a junior synonym of *Hypotheticus*, regardless of what happens to any other species that have been placed under it. If not, then *Subsequens* applies to a distinct genus, regardless of the status of the other species assigned to either genus (or generic name). Thus, generic synonymy cannot be determined without use of the genotypes.

In dividing genera we again require some means of determining which group shall retain the name. For example, when it is found that the genus *Compositus*, with species, actually contains two groups of species which deserve to be recognized as distinct genera (species 1 to 5 and 6 to 10), the original name must be retained for one of the groups.

Previously Spp. 1-10 = *Compositus* (in broad sense)

Now Spp. 1-5 = ? (*Compositus* s. str. or new genus)

Spp. 6-10 = ? (New genus or *Compositus* s. str.)

Under our Rules *Compositus* must be used for the group containing the particular species which is established as its type species or genotype. If species 4 is the genotype, then the name *Compositus* must be retained for the genus including species 4, or group 1-5.

It is thus necessary, and our Rules require, that each generic name have a genotype, to fix the application of that name. Then whenever any writer places a species in a particular genus, he is in effect stating his belief that that species is congeneric with the type species of that genus—that the two species belong in the same genus. Otherwise he would not put them together. In order to state that his species belong with the type species of this genus, he must know what the type species is and what its characteristics are. No generic transfer or assignment of a new species to a genus is much more than a guess unless the genotype is known and considered. For example, a writer

describes a new species *albus*, and he places it in the genus *Exus* because he believes it belongs with *Exus niger* which is the genotype of *Exus*. If he does not know the genotype of *Exus*, his assignment of *albus* is little more than a guess.

If a writer believes that two genera are the same and cites the name of one as a synonym of the other, he is in effect stating that the genotype of one belongs in the same genus as the genotype of the other, because otherwise they cannot be synonyms. It is impossible to prove the synonymy of two names without using the genotypes of both, since the application of each name depends entirely on its genotype.

For example, if a writer states that *Exus* and *Zeeus* are synonyms because he has a species that is called *Zeeus* which he discovers belongs with a species that is put in *Exus*, his conclusion will be completely wrong UNLESS it happens that his species of *Exus* really DOES belong with the type species of *Exus* and his species of *Zeeus* really DOES belong with the type species of *Zeeus*. If either of these should happen not to be so, then his conclusion on generic synonymy will be worthless.

No writer should ever cite a generic name as a synonym of another generic name until he, or some previous writer whose work he accepts, has determined the genotypes and found that they belong in the same genus. Any synonymy proposed on any other basis is worthless so far as the generic names are concerned.

Furthermore, no writer should ever describe a new species in a genus whose genotype has not been determined and is believed to be congeneric with the new species. Otherwise the new species will later have to be restudied to see if it really does belong in the genus indicated.

The fact that these principles have generally been overlooked does not detract from their truth. The work of many taxonomists is known to be of doubtful accuracy because they did not consider the genotypes. Since there is little in taxonomy that can be safely done without use of genotypes, this is one of the most important subjects in nomenclature, as well as one of the most neglected.